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Kim et al.

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(54) **DISPLAY APPARATUS AND METHOD FOR CONTROLLING DISPLAY APPARATUS THEREOF**

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(58) **Field of Classification Search**

CPC G06F 3/017; H04N 21/4223
USPC 715/733, 716, 767, 810, 863
See application file for complete search history.

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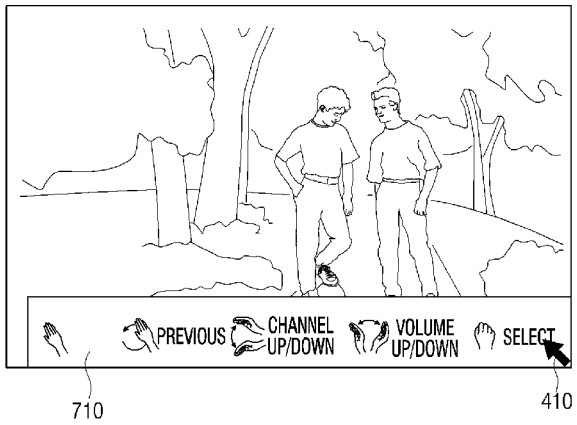
(74) *Attorney, Agent, or Firm* — Sughrue Mion, PLLC

(57) **ABSTRACT**

A display apparatus and a method for controlling a display apparatus thereof are provided. The method for controlling the display apparatus includes: receiving a mode start command from one of a plurality of input units to control a pointer; determining a type of an input unit through which the mode start command is input; and displaying the pointer on a display screen based on a result of the determining. Accordingly, a user may perform the functions of the display apparatus more conveniently according to each input apparatus.

22 Claims, 9 Drawing Sheets



(51) **Int. Cl.**

G06F 3/038	(2013.01)
H04N 5/44	(2011.01)
H04N 21/422	(2011.01)
H04N 21/4223	(2011.01)
H04N 21/431	(2011.01)
H04N 21/442	(2011.01)
H04N 21/47	(2011.01)

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FIG. 1

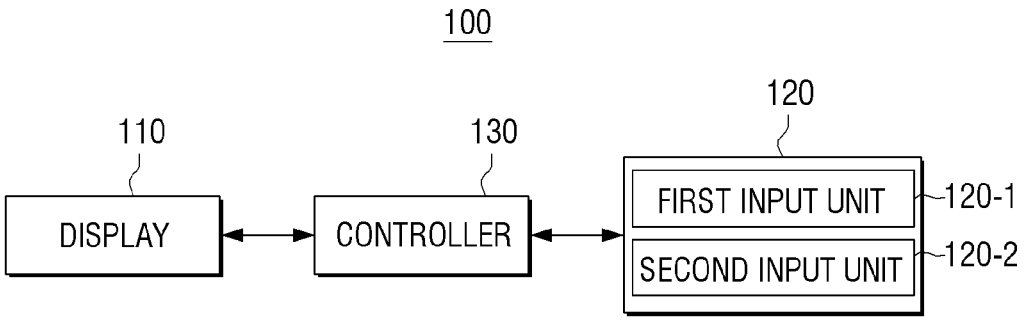

100
110
DISPLAY
130
CONTROLLER
120
FIRST INPUT UNIT
120-1
SECOND INPUT UNIT
120-2

FIG. 2

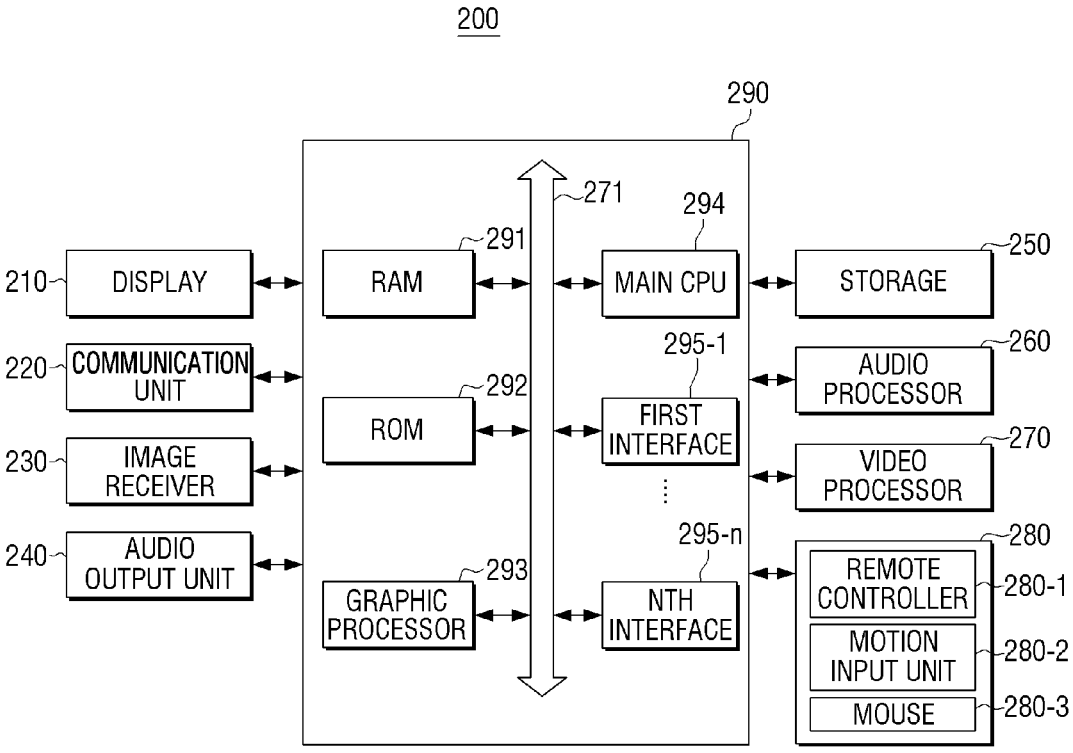

200
290
271
294
291
250
210
DISPLAY
RAM
MAIN CPU
STORAGE
295-1
260
220
COMMUNICATION UNIT
AUDIO PROCESSOR
292
ROM
FIRST INTERFACE
270
230
IMAGE RECEIVER
VIDEO PROCESSOR
295-n
280
240
AUDIO OUTPUT UNIT
293
REMOTE CONTROLLER
280-1
GRAPHIC PROCESSOR
NTH INTERFACE
MOTION INPUT UNIT
280-2
MOUSE
280-3

FIG. 3

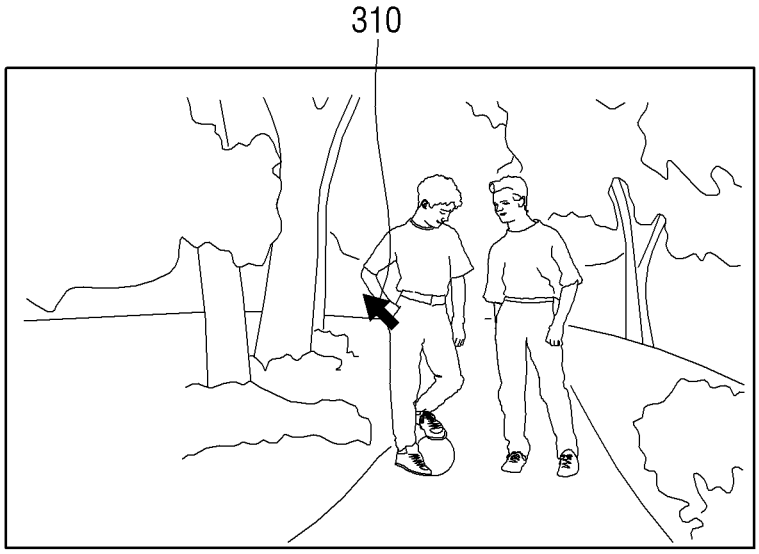


FIG. 4

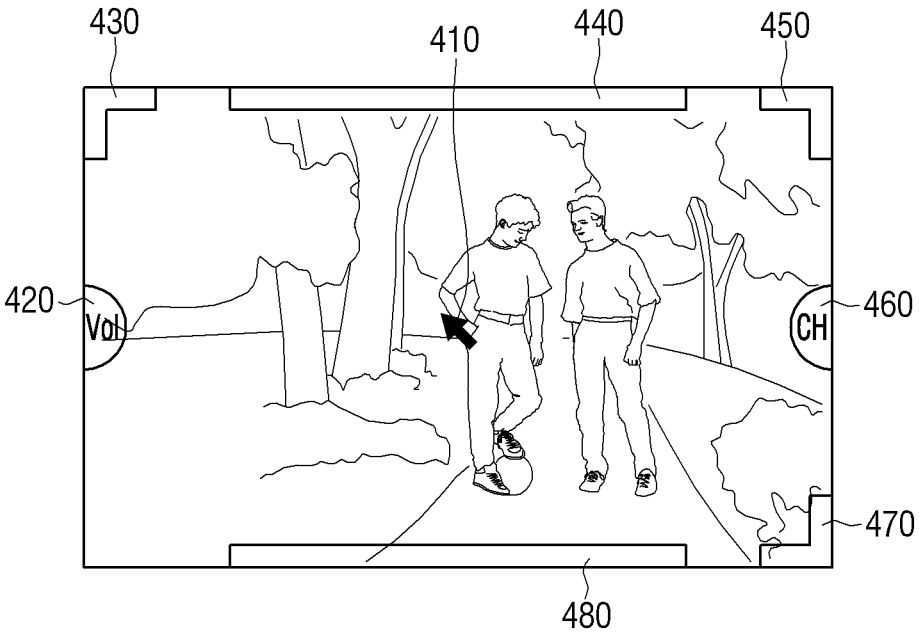


FIG. 5

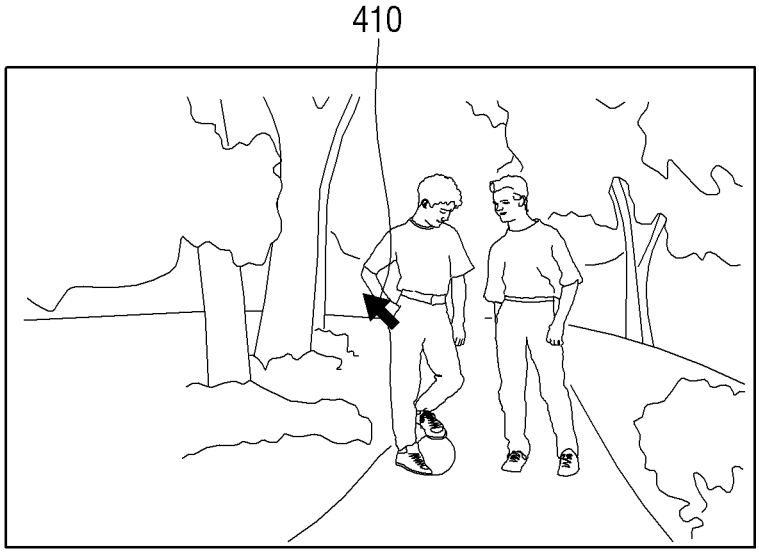


FIG. 6

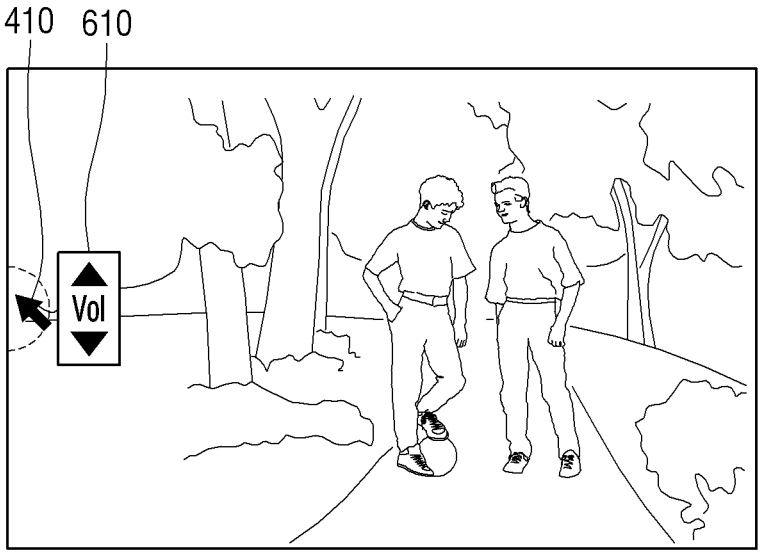


FIG. 7

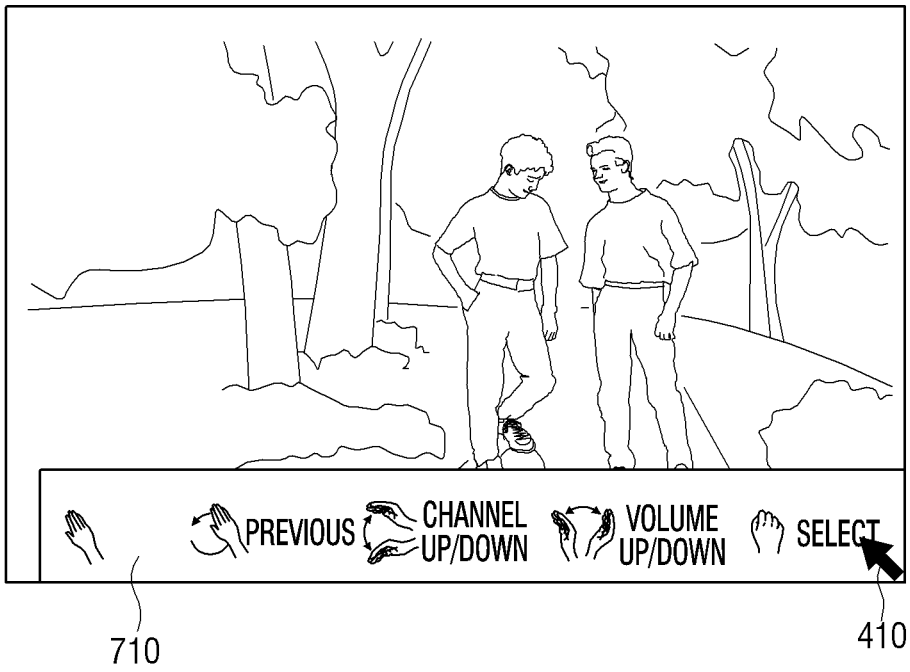


FIG. 8

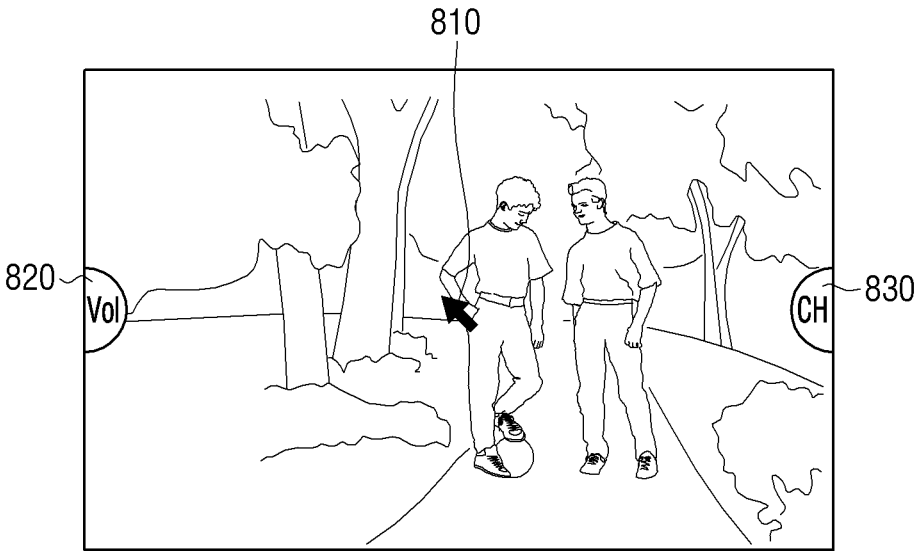
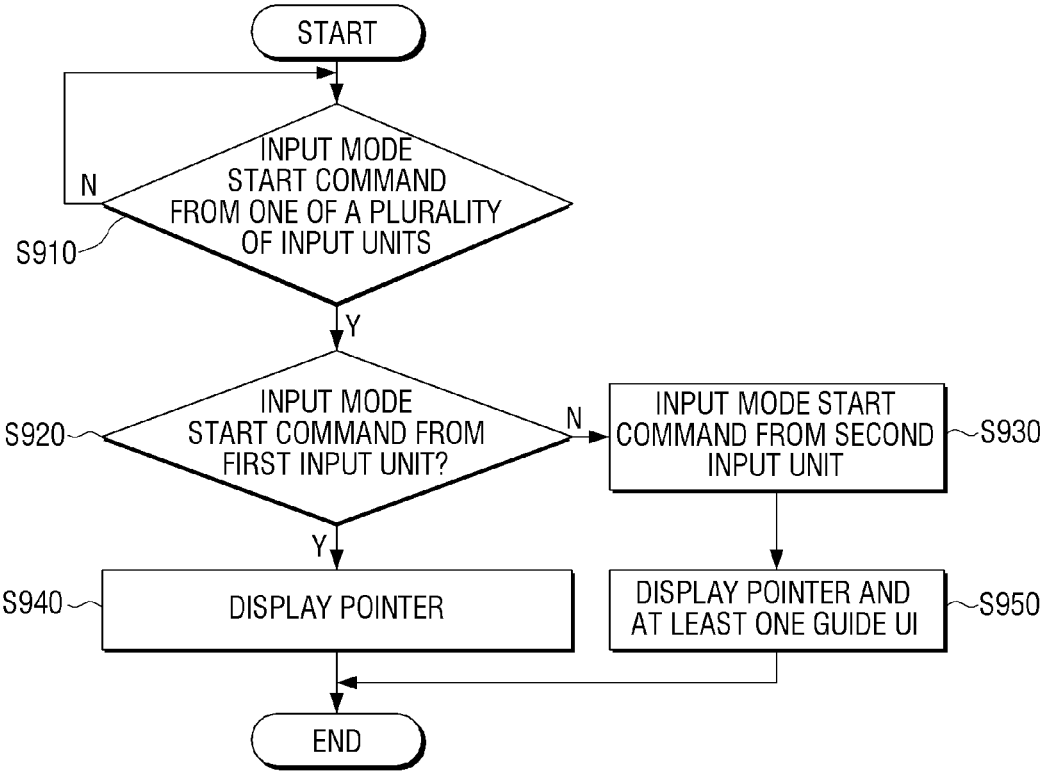


FIG. 9


START
INPUT MODE START COMMAND FROM ONE OF A PLURALITY OF INPUT UNITS
S910
N
Y
INPUT MODE START COMMAND FROM FIRST INPUT UNIT?
S920
N
INPUT MODE START COMMAND FROM SECOND INPUT UNIT
S930
Y
DISPLAY POINTER
S940
DISPLAY POINTER AND AT LEAST ONE GUIDE UI
S950
END

DISPLAY APPARATUS AND METHOD FOR CONTROLLING DISPLAY APPARATUS THEREOF

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority from Korean Patent Application No. 10-2012-0155216, filed in the Korean Intellectual Property Office on Dec. 27, 2012, the disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND

1. Field

Apparatuses and methods consistent with exemplary embodiments relate to a display apparatus and a method for controlling a display apparatus thereof, and more particularly, to a display apparatus which is capable of controlling a pointer displayed on a display screen using a plurality of input units and a method for controlling a display apparatus thereof.

2. Description of the Related Art

A display apparatus provides not only the function of receiving broadcasting but also various types of functions such as a video call function, a web browsing function, playing a game function, etc. As a display apparatus provides various types of functions, there is difficulty in controlling the display apparatus using only the buttons of a remote controller. In order to resolve this problem, related art display apparatuses are designed to control various types of functions using a pointer.

However, the related art display apparatus controls a pointer in the same way regardless of a type of an input apparatus. For example, the display apparatus displays only a pointer on a display screen, regardless of whether the pointer is controlled using a remote controller with a touch screen or using a user's motion. If a remote controller is used to control a pointer, a user may easily adjust channels or volumes without using the pointer. However, if a user's motion is used to control the pointer, it is not easy for a user to control channels or volumes without separate icons, and thus, the user needs to use a remote controller again in order to control channels or volumes.

Accordingly, there exists a need for a display apparatus which is capable of controlling a pointer based on the characteristics of each input apparatus.

SUMMARY

The exemplary embodiments provide a display apparatus which provides different User Interfaces (UIs) according to a type of input apparatus to control a pointer so that the pointer is controlled based on the characteristics of each input apparatus and a controlling method thereof.

According to an aspect of an exemplary embodiment, there is provided a method for controlling a display apparatus, the method including: receiving a mode start command from one of a plurality of input units to control a pointer; determining a type of input unit through which the mode start command is input; and, displaying the pointer on a display screen based on a result of the determining.

The displaying may include, if the mode start command is input through a first input unit from among the plurality of input units, displaying the pointer on the display screen, and if the mode start command is input through a second input unit from among the plurality of input units, displaying the pointer and at least one guide UI on the display screen.

The displaying may include, when a predetermined time is elapsed after the mode start command is input through the second input unit, removing the displayed at least one guide UI from the display screen.

The method may include, when, after the removing, the pointer is moved to one of areas where the at least one guide UI has been displayed according to a user's motion input through the second input unit, displaying an item corresponding to the at least one guide UI which has been displayed on the area where the pointer is moved.

The at least one guide UI may include at least one of a guide UI to generate a volume control icon, a guide UI to generate a channel control icon, a guide UI to check a message, a guide UI to guide recommended contents, a guide UI to guide a function corresponding to a user's motion, and a guide UI to convert a mode to a mode for providing contents.

The at least one guide UI may display a part of the item corresponding to the at least one guide UI.

The at least one guide UI may be displayed on an outer area of the display screen.

The method may further include, if the mode start command is input through a third input unit from among the plurality of input units, displaying the pointer and guide UIs of which number is different from that of the at least one guide UI on the display screen.

The first input unit may be a remote controller to control the display apparatus, the second input unit may be a motion input unit to obtain information regarding a user's motion by photographing the user's motion, and the third input unit may be a mouse.

According to an aspect of another exemplary embodiment, there is provided a display apparatus, the display apparatus including: a receiver which receives a user command to control a pointer from a plurality of input units; a display screen which displays the pointer; and a controller which determines a type of the input unit through which the mode start command is input and displays the pointer on the display screen based on a result of the determination.

The controller, if the mode start command is input through a first input unit from among the plurality of input units, may control the display screen to display the pointer on the display screen, and if the mode start command is input through a second input unit from among the plurality of input units, may control the display screen to display the pointer and at least one guide UI.

The controller, when a predetermined time is elapsed after the mode start command is input through the second input unit, may control the display screen to remove the displayed at least one guide UI.

The controller, when a user's motion is input through the second input unit after the at least one guide UI is removed, may control the display screen to move the pointer according to the user motion, and when the pointer is moved to one of areas where the at least one guide UI has been displayed according to the user's motion, may control the display screen to display an item corresponding to the at least one guide UI which has been displayed on the area where the pointer is moved.

The at least one guide UI may include at least one of a guide UI to generate a volume control icon, a guide UI to generate a channel control icon, a guide UI to check a message, a guide UI to guide recommended contents, a guide UI to guide a function corresponding to a user's motion, and a guide UI to convert a mode to a mode for providing contents.

The at least one guide UI may display a part of the item corresponding to the at least one guide UI.

The at least one guide UI may be displayed on an outer area of the display screen.

The controller, if the mode start command is input through a third input unit from among the plurality of input units, may control the display screen to display the pointer and guide UIs of which number is different from that of the at least one guide UI on the display screen.

The first input unit may be a remote controller to control the display apparatus, the second input unit may be a motion input unit to obtain information regarding a user's motion by photographing the user's motion, and the third input unit may be a mouse.

According to an aspect of another exemplary embodiment, there is provided a controlling method of an image processing apparatus, the controlling method including: when a mode start command is received from one of a plurality of input units, determining a type of input unit through which the mode start command is input; and controlling the image processing apparatus to display a pointer on a display screen based on a result of determining.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and/or other aspects will be more apparent by describing certain exemplary embodiments thereof with reference to the accompanying drawings, in which:

FIG. **1** is a block diagram illustrating configuration of a display apparatus briefly according to an exemplary embodiment;

FIG. **2** is a block diagram illustrating configuration of a display apparatus in detail according to an exemplary embodiment;

FIG. **3** is a view provided to explain a mode to control a pointer using a remote controller according to an exemplary embodiment;

FIGS. **4** to **7** are views provided to explain a mode to control a pointer using a motion input unit according to an exemplary embodiment;

FIG. **8** is a view provided to explain a mode to control a pointer using a mouse according to an exemplary embodiment; and

FIG. **9** is a flowchart provided to explain the method for controlling a display apparatus according to an exemplary embodiment.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

Certain exemplary embodiments are described in higher detail below with reference to the accompanying drawings.

In the following description, like drawing reference numerals are used for the like elements, even in different drawings. The matters defined in the description, such as detailed construction and elements, are provided to assist in a comprehensive understanding of exemplary embodiments. However, exemplary embodiments can be practiced without those specifically defined matters. Also, well-known functions or constructions are not described in detail since they would obscure the application with unnecessary detail.

FIG. **1** is a block diagram illustrating configuration of a display apparatus **100** according to an exemplary embodiment. Referring to FIG. **1**, the display apparatus **100** comprises a display **110**, an input unit **120**, and a controller **130**. The input unit **120** comprises a first input unit **120-1** and a second input unit **120-2**. While not restricted thereto, the display apparatus **100** according to an exemplary embodiment may be a digital television (TV). The display apparatus **100** may be realized as various types of display apparatuses including a personal computer (PC), a projection television, a tablet PC, a mobile phone, etc.

The display **110** displays various image data under the control of the controller **130**. In particular, in a mode to control the functions of the display apparatus **100** using a pointer, the display **110** may display a pointer. In addition, the display **110** may display an item corresponding to at least one guide UI.

The input unit **120** receives a user command to control overall functions of the display apparatus **100**. For example, the input unit **120** according to an exemplary embodiment comprises the first input unit **120-1** and the second input unit **120-2** to control a pointer displayed on the display **110**. The first input unit **120-1** may be a remote controller including a pointing function, and the second input unit **120-2** may be a motion input unit which receives a user's motion.

The input unit **120** may receive a motion start command to enter into a mode to control a pointer. For example, the mode start command through the first input unit **120-1** may be a command to select a predetermined button on a remote controller, and the motion start command through the second input unit **120-2** may be a user's motion (e.g., a user's motion of waving hands left and right).

The controller **130** controls overall functions of the display apparatus **100** according to a user command through the input unit **120**. For example, when a mode start command is input from one of a plurality of input units **120-1**, **120-2** to control a pointer on the display **110**, the controller **130** determines a type of input unit **120** through which the mode start command is input. If the controller **130** determines that the mode start command is input through the first input unit **120-1** from among a plurality of input units, the controller **130** may display the pointer on the display **110**. If the controller **130** determines that the mode start command is input through the second input unit **120-2** from among a plurality of input units, the controller **130** may display the pointer and at least one guide UI on the display **110**.

Specifically, if the mode start command is input through the first input unit **120-1**, the controller **130** may enter into a first mode where the pointer is controlled using the first input unit **120-1**. In the first mode, the controller **130** may display the pointer at the center of the display **110**. Subsequently, if a command to move the displayed pointer is input through the first input unit **120-1**, the controller **130** may move the displayed pointer according to the command, and if a command to select the pointer is input, the controller **130** may select an item where the pointer is located.

However, if the mode start command is input through the second input unit **120-2**, the controller **130** may enter into a second mode where the pointer is controlled using the second input unit **120-2**. While the first input unit **120-1** has buttons, the second input unit **120-2** does not have any buttons. Therefore, in order to perform the same functions as those buttons on the first input unit **120-1**, the controller **130** may display a pointer and at least one guide UI. Here, the at least one guide UI is a UI to generate an item corresponding to a specific function of the display apparatus **100**. While not restricted thereto, the at least one guide UI may include at least one of a guide UI to generate a volume control icon, a guide UI to generate a channel control icon, a guide UI to check a message, a guide UI to guide recommended contents, a guide UI to guide a function corresponding to a user's motion, and a guide UI to convert a mode to a mode for providing contents.

The at least one guide UI may include a part of contents of a corresponding item, but this is only an example. The at least one guide UI may display only a title of the item without any

indicator. Further, the at least one guide UI may be displayed on an outer area of the display **110**.

If a predetermined time (for example, one second) is passed, the controller **130** may control the display **110** to remove the displayed at least one guide UI on the display **110**.

If a command to move a pointer is input through the second input unit **120-2** after the displayed at least one guide UI is removed, the controller **130** may move the displayed pointer according to the command. If the pointer is moved to an area where the at least one guide UI has been displayed according to the command, the controller **130** may control the display **110** to display an item corresponding to the at least one guide UI which has been displayed on the area where the pointer is moved. For example, if the pointer is moved to an area where a guide UI for generating a volume control icon has been displayed, the controller **130** may control the display **110** to display the volume control icon on the area.

If y the item is displayed, the controller **130** may perform a function corresponding to the item using the item. For example, if the volume control icon is displayed, the controller **130** may adjust the volume of the display apparatus **100** using the displayed volume control icon.

As described above, the display apparatus **100** operates differently according to the type of an input apparatus to control a pointer. Therefore, a user may control the display apparatus **100** more conveniently according to the characteristics of the input apparatus.

Hereinafter, a display apparatus will be explained in greater detail with reference to FIGS. **2** to **8**. Referring to FIG. **2**, the display apparatus **200** comprises a display **210**, a communication unit **220**, an image receiver **230**, an audio output unit **240**, a storage **250**, an audio processor **260**, a video processor **270**, an input unit **280**, and a controller **290**.

Although FIG. **2** illustrates components in the display apparatus **200** for providing various types of functions including a communication function, a broadcast reception function, a video reproduction function, and a display function, the exemplary embodiments are not limited thereto. Therefore, some of the components illustrated in FIG. **2** may be omitted or changed, or other components may be added, depending on exemplary embodiments.

The display **210** displays at least one of a video frame which is generated by a video processor **270** and various images which are generated by a graphic processor **293**. In particular, the display **210** may display a pointer to control the functions of the display apparatus **200**. In addition, the display **210** may display at least one guide UI and an item according to a type of the input unit **280** which controls the pointer.

The communication unit **220** performs communication with various types of external apparatuses according to various types of communication methods. The communication unit **220** may comprise various communication chips including a WiFi chip, a Bluetooth chip, an Near Field Communication (NFC) chip, a wireless communication chip, etc., Here, the WiFi chip, the Bluetooth chip, and the NFC chip perform communication according to a WiFi method, a Bluetooth method, and an NFC method, respectively. The NFC chip refers to a chip which operates according to the NFC method which uses 13.56 MHz RF-ID frequency band from among various RF-ID frequency bands, such as 135 kHz, 13.56 MHz, 433 MHz, 860~960 MHz, 2.45 GHz, etc. When the WiFi chip or the Bluetooth chip is used, various connection information such as SSID (Service Set Identification), session key, etc. is received/transmitted in advance so that communication can be performed using the same and various information can be received/transmitted. The wireless communication chip refers to a chip which performs communication according to various communication standards, such as IEEE (Institute of Electrical and Electronics Engineers), Zigbee, 3G (3rd Generation), 3GPP (3rd Generation Partnership Project), LTE (Long Term Evolution), etc.

The image receiver **230** receives image data from various sources. For example, the image receiver **230** may receive broadcast data from an external broadcasting station, and may receive image data from an external apparatus (for example, a DVD apparatus).

The audio output unit **240** outputs not only various audio data processed by the audio processor **260** but also various alarm sounds or voice messages.

The storage **250** stores various modules to operate the display apparatus **200**. For example, the storage **250** may store software including a base module, a sensing module, a communication module, a presentation module, a web browser module, and a service module, etc. Here, the base module is a basic module which processes a signal transmitted from hardware included in the display apparatus **200** and transmits the processed signal to an upper layer module. The sensing module collects information from various sensors, analyzes and manages the collected information, and may include a face recognition module, a voice recognition module, a motion recognition module, an NFC recognition module, etc. The presentation module is a module to compose a display screen, and may include a multimedia module to reproduce and output multimedia contents and a UI rendering module to perform UI and graphic processing. The communication module is a module to perform communication with outside. The web browser module is a module to access a web server by performing web browsing. The service module is a module including various applications to provide various services.

As described above, the storage **250** may include various types of program modules, but some of the various types of program modules may be omitted, changed, or added according to the type and characteristics of the display apparatus **200**. For example, if the display apparatus **200** is realized as a tablet PC, the basic module may further include a determination module to determine a GPS-based location, and the sensing module may further include a sensing module to sense the operation of a user.

The audio processor **260** performs processing with respect to audio data. The audio processor **260** may perform various processing including a decoding, an amplifying, a noise filtering, etc. with respect to audio data. The audio data processed by the audio processor **260** may be output to the audio output unit **240**.

The video processor **270** processes image data received from the image receiver **230**. The video processor **270** may perform various image processing including a decoding, a scaling, a noise filtering, a frame rate conversion, a resolution conversion, etc. with respect to image data.

The input unit **280** receives a user command to control overall operations of the display apparatus **200**. In particular, the input unit **280** according to an exemplary embodiment may control a pointer displayed on the display **210**, and may comprise a remote controller **280-1**, a motion input unit **280-2**, and a mouse **280-3**.

The remote controller **280-1** may include a plurality of buttons to control the functions of the display apparatus **200** and a touch screen to control a pointer. If a user's touch is input on the touch screen, the remote controller **280-1** may transmit information regarding a location where the user's touch is input to the controller **290**. The controller **290** may move the pointer displayed on the display **210** based on the

information regarding the location where the user's touch is input. If a selection command (for example, touch twice in a row) is input on the touch screen, the remote controller **280-1** may transmit the selection command to the controller **290**. Subsequently, the controller **290** may select an item where the pointer is located.

Although the remote controller according to an exemplary embodiment may receive a user's manipulation using a touch screen on the remote controller, but this is only an example. The technical feature of the exemplary embodiment may also be applied to a remote controller having a pointing device function.

The motion input unit **280-2** receives an image signal photographing a user's motion (for example, successive frames) and provides the image signal to the controller **290**. For example, the motion input unit **280-2** may be realized as a camera unit including a lens and an image sensor. In addition, the motion input unit **280-2** may be realized as an integral part of the display apparatus **200**, or as a separate component from the display apparatus **200**. The motion input unit **280-2** which is formed separately from the display apparatus **200** may be connected via cable or wirelessly.

If a user's motion is input through the motion input unit **280-2**, the controller **290** recognizes the motion using a motion sensing module stored in the storage **250**. The motion recognition may be performed by dividing an image corresponding to the user's motion input through the motion input unit **280-2** (for example, successive frames) into a background area and a hand area (for example, an area where a hand is open or clenched), and by recognizing the successive movement of the hand using the motion recognition module. If the user's motion is input, the controller **290** stores the received image by frame unit, and senses an object of the user's motion (for example, a user's hand) using the stored frames. The controller **290** detects the object by sensing at least one of a shape, a color, and a movement of the object included in the frames. The controller **290** may trace the movement of the detected object using a location of each object included in the frames.

The controller **290** determines a motion according to the shape and movement of the traced object. For example, the controller **290** determines the user's motion using at least one of changes in the shape of the object, a speed, a location, and a direction. While not restricted thereto, the user's motion includes a 'grab' which is the motion of clenching a hand, a 'pointing move' which is the motion of moving a displayed cursor using a hand, a 'slap' which is the motion of moving a hand in one direction at higher than a certain speed, a 'shake' which is the motion of shaking a hand left/right or up/down, and a 'rotate' which is the motion of rotating a hand. However, the technical feature of the present invention may also be applied to other motions that the above-described motions. For example, the user's motion may further include a 'spread' which is the motion of spreading a clenched hand.

In order to determine whether a user's motion is the 'pointing move' or the 'slap', the controller **290** determines whether an object is moved beyond a predetermined area (for example, a square of 40 cm×40 cm) within a predetermined time (for example, 800 ms). If the object is not moved beyond the predetermined area within the predetermined time, the controller **290** may determine that the user's motion is the 'pointing move'. However, if the object is moved beyond the predetermined area within the predetermined time, the controller **290** may determine that the user's motion is the 'slap'. In another example, if it is determined that the speed of an object is less than a predetermined speed (for example, 30 cm/s), the controller **290** may determine that the user's motion is the 'pointing move'. If it is determined that the speed of the object is greater than the predetermined speed, the controller **290** determines that the user's motion is the 'slap'.

As described above, the controller **290** may control the display apparatus **200** using a recognized motion. For example, the controller **290** may control the display apparatus **200** including at least one of the functions, such as switching channels, adjusting volume, reproducing contents (for example, video, music, photo, etc.), and internet browsing, etc.

The mouse **280-3** is connected to the display apparatus **200** via cable or wirelessly so as to receive a pointer movement command or a pointer selection command.

The input unit **120** may receive a mode start command to enter into a mode to control a pointer. Here, the mode start command through the remote controller **280-1** may be a command to select a predetermined button on the remote controller **280-1**, the mode start command through the motion input unit **280-2** may be a user's motion (for example, the motion of shaking the hand left and right a plurality of times), and the mode start command through the mouse **280-3** may be an operation of connecting to the display apparatus **200**.

The controller **290** may control the overall operations of the display apparatus **200** using various programs stored in the storage **250**.

As illustrated in FIG. **2**, the controller **290** comprises a RAM **291**, a ROM **292**, a graphic processor **293**, a main CPU **294**, first to nth interface **295-1**~**295-*n***, and a bus **296**. In this case, the RAM **291**, the ROM **292**, the graphic processor **293**, the main CPU **294**, and the first to nth interface **295-1**~**295-*n*** may be connected to each other through the bus **296**.

The ROM **292** stores a set of commands for system booting. If a turn-on command is input and power is supplied, the main CPU **294** copies an O/S stored in the storage **250** according to a command stored in the ROM **292** and executes the O/S to boot the system. Once the system booting is completed, the main CPU **294** copies various application programs stored in the storage **250** and performs various operations by executing the application programs copied in the RAM **291**.

The graphic processor **293** generates an image including various objects such as icon, image, text, etc. using an operator (not shown) and a renderer (not shown). The operator calculates property values such as coordinates, a shape, a size, a color, etc. of the image where each object is displayed according to a layout of a screen using a control command received from the input unit **280**. The renderer generates a screen of various layouts including an object based on the property values calculated by the operator. The screen generated by the renderer is displayed within a display area of the display **210**.

The main CPU **294** performs booting using the O/S stored in the storage **250** by accessing the storage **250**. In addition, the main CPU **294** performs various operations using various programs, contents, data, and etc. stored in the storage **250**.

The first to nth interface **295-1** to **295-*n*** are connected to the above-described various components. One of the interface may be a network interface which is connected to an external apparatus through network.

In particular, if a mode start command is input from one of a plurality of input units **280-1**, **280-2**, **280-3**, the controller **290** may determine a type of an input unit through which the mode start command is input. For example, if the mode start command is input from the remote controller **280-1**, the controller **290** may convert a mode of the display apparatus **200** to a remote controller control mode where a pointer on the

display is controlled using the remote controller **280-1**. If the mode start command is input through the motion input unit **280-2**, the controller **290** may convert the mode of the display apparatus **200** to a motion control mode where the pointer on the display is controlled using a user's motion input to the motion input unit **280-2**. If the mode start command is input through the mouse **280-3**, the controller **290** may convert the mode of the display apparatus **200** to a mouse control mode.

If the mode of the display apparatus **200** is converted to the remote controller control mode, the controller **290** may control the display **210** to display a pointer **310** at the center of the display screen, as illustrated in FIG. **3**. In this case, if the displayed pointer is controlled by the remote controller, an additional guide UI is not displayed on the display screen since the remote controller has a plurality of buttons to perform the functions of the display apparatus **200** (for example, controlling volume, switching channels, etc.) and various functions of the display apparatus **200** (for example, selecting an item) may be performed using only the pointer.

If the mode is converted to the motion control mode, the controller **290** may control the display **210** to display a pointer **410** at the center of the display screen and to display a plurality of guide UIs **420** to **480** at the outer sides (e.g., at the corner) of the display screen, as illustrated FIG. **4**. In this case, the plurality of guide UIs may be UIs for performing a specific function of the display apparatus **200** or generating an item.

A plurality of guide UIs may include a guide UI **420** to generate a volume control icon, a guide UI **430** to move to the previous screen, a guide UI **440** to check a message, a guide UI **450** to convert a mode to a mode for providing contents, a guide UI **460** to generate a channel control icon, a guide UI **470** to guide a function corresponding to a user's motion, and a guide UI **480** to guide recommended contents. For convenience of description, although the guide UIs may include the above-described UIs in the exemplary embodiment, it is understood that another exemplary embodiment is not limited thereto. For example, the plurality of guide UIs may include various UIs, such as a UI to generate an electronic manual, a UI to generate a channel list, etc.

A guide UI may not display a separate indicator, and may display the function of the display apparatus **200** or a title of an item corresponding to the guide UI. For example, The guide UI **420** to generate a volume control icon and the guide UI **460** to generate a channel control icon may display "Vol" and "CH" representing each function, but the UI **430** to move to the previous screen, the guide UI **440** to check a message, the guide UI **450** to a mode to a mode for providing contents, the guide UI **470** to guide a function corresponding to a user's motion, and the guide UI **480** to guide recommended contents may not display the indicator.

The guide UI according to an exemplary embodiment may display a part of the item.

If a predetermined time (for example, 1 second) is elapsed after the pointer **410** and the plurality of guide UIs **420** to **480** are displayed, the controller **290** may control the display **210** to remove the displayed plurality of guide UIs from the display screen so that only the pointer **410** remains on the display screen, as illustrated in FIG. **5**.

Subsequently, if a user's motion is input through the motion input unit **280-2**, the controller **290** may move the displayed pointer according to the user's motion. If the pointer is moved to one of the areas where the plurality of guide UIs **420** to **480** are displayed according to the user's motion, the controller **290** may control the display **210** to display the item corresponding to the guide UI which has been displayed on the area where the pointer is moved.

For example, if the pointer **410** is moved to the area where the guide UI **420** to generate a volume control icon has been displayed, the controller **290** may control the display **210** to display a volume control icon **610**, as illustrated in FIG. **6**. In this case, the volume control icon **610** may include a volume up icon, a volume down icon, and current volume information.

If the pointer **410** is moved to the volume up icon according to the user's motion input through the motion input unit **280-2**, and a selection command is input through the motion input unit **280-2**, the controller **290** may increase the volume. Alternatively, if the pointer **410** is moved to the volume down icon according to the user's motion input through the motion input unit **280-2**, and a selection command is input through the motion input unit **280-2**, the controller **290** may decrease the volume.

If a volume control command is not input through the volume control icon **610** for a predetermined time (for example, 10 seconds), the controller **290** may control the display **210** to remove the volume control icon **610** from the display screen.

If the pointer **410** is moved to the area where the guide UI **470** to guide a function corresponding to the user's motion has been displayed, the controller **290** may control the display **210** to display motion guide information **710**, as illustrated in FIG. **7**. The motion guide information **710** may display the functions performed by the display apparatus **200** according to the user's motion. In this case, the controller **290** may control the display **210** to generate the guide UI **470** to guide a function corresponding to the user's motion such that a size of the guide UI **470** is magnified gradually as it approaches the left side.

As described above, if the display apparatus **200** is controlled through the motion input unit **280-2**, the pointer **410** and the plurality of guide UIs **420** to **480** are displayed so that a user may perform the functions of the display apparatus **200** without using any additional input apparatus.

If a mode is converted to the mouse control mode, the controller **290** may control the display **210** to display a pointer **810** at the center of the display screen, and to display a guide UI **820** to generate a volume control icon **820** and a guide UI **830** to generate a channel control icon outside of the display screen, as illustrated in FIG. **8**. That is, if the mode is converted to the mouse control mode, the guide UIs of which number is less than that of motion control mode may be displayed.

As described above, the guide UIs are displayed differently according to a type of the input unit **280** to control a pointer on the display and a user may perform various functions of a display apparatus **200** using the pointer according to the characteristics of the input apparatus.

Hereinafter, the method for controlling the display apparatus **100** will be explained with reference to FIG. **9**.

Referring to FIG. **9**, the display apparatus **100** receives a mode start command from one of a plurality of input units **120-1**, **120-2** (operation S**910**). In this case, the mode start command received through the first input unit **120-1** may be a command to select a predetermined button on a remote controller, and the mode start command received through the second input unit **120-2** may be a user's motion (for example, the motion of shaking a hand a plurality of times).

Subsequently, the display apparatus **100** determines whether the mode start command is received from the first input unit **120-1** (operation S**920**). In this case, the first input unit **120-1** may be a remote controller.

If the mode start command is input from the first input unit **120-1** (operation S**920**—Y), the display apparatus **100** dis-

plays a pointer at the center of a display screen (operation S940). The display apparatus **100** may control the pointer using the first input unit **120-1**.

If the mode start command is not input from the first input unit **120-1** (operation S920—N), the display apparatus **100** determines that the mode start command is input from the second input unit **120-2** (operation S930).

If the mode start command is input from the second input unit **120-2**, the display apparatus **200** displays the pointer and at least one guide UI on the display screen (operation S950). In this case, the at least one guide UI may be a UI to perform the functions of the display apparatus **100** or to generate an item. For example, the at least one guide UI according to an exemplary embodiment may include a guide UI to generate a volume control icon, a guide UI to move to the previous screen, a guide UI to check a message, a guide UI to convert a mode to a mode for providing contents, a guide UI to generate a channel control icon, a guide UI to guide a function corresponding to a user's motion, and a guide UI to guide recommended contents.

While the above-described exemplary embodiments relate to a display apparatus, it is understood that other exemplary embodiments are not limited thereto. For example, one or more other exemplary embodiments may relate to an image processing apparatus such as a set-top box, a stand-alone control device, an audio/video receiver, an optical media player, an image source, etc.

While not restricted thereto, an exemplary embodiment can be written as computer programs and can be implemented in general-use digital computers that execute the programs using a non-transitory computer readable medium which stores a program including the step of receiving a mode start command from one of a plurality of input units to control a pointer, the step of displaying the pointer when a mode start command is input through the first input unit from among the plurality of input units, and the step of displaying the pointer and at least one guide UI on the display screen when a mode start command is input through the second input unit from among the plurality of input units may be provided.

Examples of the non-transitory computer readable recording medium include magnetic storage media (e.g., ROM, floppy disks, hard disks, etc.) and optical recording media (e.g., CD-ROMs, or DVDs). Also, the exemplary embodiments may be written as computer programs transmitted over a computer-readable transmission medium, such as a carrier wave, and received and implemented in general-use digital computers that execute the programs. Moreover, while not required in all aspects, one or more units of the display apparatus illustrated in FIG. **2** can include a processor or microprocessor executing a computer program stored in a computer-readable medium.

The foregoing embodiments and advantages are merely exemplary and are not to be construed as limiting the present inventive concept. The present teaching can be readily applied to other types of apparatuses. Also, the description of the exemplary embodiments of the present inventive concept is intended to be illustrative, and not to limit the scope of the inventive concept as defined by the following claims, and many alternatives, modifications, and variations will be apparent to those skilled in the art.

What is claimed is:

1. A method for controlling a display apparatus, the method comprising:

receiving a mode start command from one of a plurality of input units to control a pointer;

determining a type of an input unit through which the mode start command is input; and

displaying the pointer on a display screen based on a result of the determining,

wherein the displaying comprises, if the mode start command is input through a first input unit from among the plurality of input units, displaying the pointer only on the display screen, and if the mode start command is input through a second input unit from among the plurality of input units, displaying the pointer and at least one guide user interface (UI) on the display screen.

2. The method as claimed in claim **1**, wherein the displaying comprises, when a predetermined time is elapsed after the mode start command is input through the second input unit, removing the displayed at least one guide UI from the display screen.

3. The method as claimed in claim **2**, further comprising:

when, after the removing, the pointer is moved to one of areas where the at least one guide UI has been displayed according to a user's motion input through the second input unit, displaying an item corresponding to the at least one guide UI which has been displayed on the area where the pointer is moved.

4. The method as claimed in claim **1**, wherein the at least one guide UI includes at least one of a guide UI to generate a volume control icon, a guide UI to generate a channel control icon, a guide UI to check a message, a guide UI to guide recommended contents, a guide UI to guide a function corresponding to a user's motion, and a guide UI to convert a mode to a mode for providing contents.

5. The method as claimed in claim **1**, wherein the at least one guide UI displays a part of the item corresponding to the at least one guide UI.

6. The method as claimed in claim **5**, wherein the part of the item is a title of the at least one guide UI.

7. The method as claimed in claim **1**, wherein the at least one guide UI is displayed on an outer area of the display screen.

8. The method as claimed in claim **1**, further comprising:

when a mode start command is input through a third input unit from among the plurality of input units, displaying the pointer and guide UIs of which number is different from that of the at least one guide UI on the display screen.

9. The method as claimed in claim **8**, wherein the first input unit is a remote controller to control the display apparatus, the second input unit is a motion input unit to obtain information regarding a user's motion by photographing the user motion, and the third input unit is a mouse.

10. A display apparatus, comprising:

a receiver configured to receive a user command to control a pointer from a plurality of input units;

a display screen configured to display the pointer; and

a controller configured to determine a type of the input unit through which the mode start command is input and to display the pointer on the display screen based on a result of the determination,

wherein the controller controls the display screen to display the pointer only on the display screen, if the mode start command is input through a first input unit from among the plurality of input units, and controls the display screen to display the pointer and at least one guide UI, if the mode start command is input through a second input unit from among the plurality of input units.

11. The apparatus as claimed in claim **10**, wherein the controller, when a predetermined time is elapsed after the mode start command is input through the second input unit, controls the display screen to remove the displayed at least one guide UI.

12. The apparatus as claimed in claim 11, wherein the controller, when a motion is input through the second input unit after the at least one guide UI is removed, controls the display screen to move the pointer according to the user motion, and when the pointer is moved to one of areas where the at least one guide UI has been displayed according to the user's motion, controls the display screen to display an item corresponding to the at least one guide UI which has been displayed on the area where the pointer is moved.

13. The apparatus as claimed in claim 10, wherein the at least one guide UI includes at least one of a guide UI to generate a volume control icon, a guide UI to generate a channel control icon, a guide UI to check a message, a guide UI to guide recommended contents, a guide UI to guide a function corresponding to a user motion, and a guide UI to convert a mode to a mode for providing contents.

14. The apparatus as claimed in claim 10, wherein the at least one guide UI displays a part of the item corresponding to the at least one guide UI.

15. The apparatus as claimed in claim 14, wherein the part of the item is a title of the at least one guide UI.

16. The apparatus as claimed in claim 10, wherein the at least one guide UI is displayed on an outer area of the display screen.

17. The apparatus as claimed in claim 10, wherein the controller, when a mode start command is input through a third input unit from among the plurality of input units, controls the display screen to display the pointer and guide UIs of which number is different from that of the at least one guide UI on the display screen.

18. The apparatus as claimed in claim 17, wherein the first input unit is a remote controller to control the display apparatus, the second input unit is a motion input unit to obtain information regarding a user's motion by photographing the user's motion, and the third input unit is a mouse.

19. A control method of an image processing apparatus, the control method comprising:

when a mode start command is received from one of a plurality of input units, determining a type of input unit through which the mode start command is input; and

controlling the image processing apparatus to display a pointer on a display screen based on a result of the determining,

wherein the controlling comprises, if the mode start command is input through a first input unit from among the plurality of input units, displaying the pointer only on the display screen, and if the mode start command is input through a second input unit from among the plurality of input units, displaying the pointer and at least one guide UI on the display screen.

20. The method as claimed in claim 19, wherein the at least one guide UI includes at least one of a guide UI to generate a volume control icon, a guide UI to generate a channel control icon, a guide UI to check a message, a guide UI to guide recommended contents, a guide UI to guide a function corresponding to a user's motion, and a guide UI to convert a mode to a mode for providing contents.

21. A non-transitory computer readable recording medium in which a program for executing the method of claim 1 is recorded.

22. A non-transitory computer readable recording medium in which a program for executing the method of claim 19 is recorded.

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